

Remarks

In view of the above amendments and the following remarks, reconsideration of the rejections and further examination are requested.

The specification and abstract have been reviewed and revised to make a number of editorial revisions thereto. A substitute specification and abstract including the revisions have been prepared and are submitted herewith. No new matter has been added. Also submitted herewith are marked-up copies of the specification and abstract indicating the changes incorporated therein.

Claims 3, 4, 7, 9, 10, 19 and 20 have been rejected under 35 U.S.C. §102(b) as being anticipated by Miller (US 2003/0092994). Claims 1, 2, 5, 6, 8, 11 and 15-18 have been rejected under 35 U.S.C. §103(a) as being obvious over Miller in view of Banta, Jr. (US 6,055,861).

Claims 1-20 have been canceled without prejudice or disclaimer to the subject matter contained therein. Further, new claims 21-36 have been added. Claims 21, 23, 25, 27, 29, 31, 33 and 35 include features from claims 1 and 5, claims 1 and 6, claims 2 and 8, claims 2 and 11, claims 3 and 9, claims 3 and 12, claims 4 and 10, and claims 4 and 13, respectively. Further, claims 22, 24, 26, 28, 30, 32, 34 and 36 include the feature from claims 7 and 14-20.

The above-mentioned rejections are submitted to be inapplicable to new claims 21-36 for the following reasons.

Claim 21 is patentable over the combination of Miller and Banta, Jr., since claim 21 recites an ultrasonic diagnostic apparatus including, in part, a controller such that when parallel reception is performed by the ultrasonic diagnostic apparatus, the controller controls delay times corresponding to respective elements of an array of elements to meander a movement track of focus points in reception dynamic focusing in relation to transmission focus positions so that a composite beam of a received beam and a transmitted beam is substantially shaped as a straight line.

In the present invention, as recited in claim 21, directivity of a received beam is controlled by controlling delay times, whereby a composite beam between the received beam and a transmitted beam is substantially shaped as a straight line. With this configuration, the composite beams, each between a transmitted beam and a received beam, can be formed in parallel even during parallel reception, and thus, the significant effect of preventing the appearance of vertical strips on a display image can be achieved. As a result, distortion of an

associated image is reduced. The combination of Miller and Banta, Jr. fails to disclose or suggest this feature of claim 21.

Regarding Miller, it discloses an ultrasonic probe having a transducer array 42 and a control processor 140. The control processor 140 is capable of providing delay commands to both transmit beamformer channels 215 and receive beamformer channels 225. (See page 7, paragraphs [0083]-[0087] and Figure 5B).

While the control processor 140 of Miller is capable of providing delay commands to the receive beamformer channels 225, it is apparent that there is no disclosure or suggestion in Miller that, when parallel reception is performed, the control processor 140 provides the delay commands in reception dynamic focusing so that a composite beam of a received beam and a transmitted beam is substantially shaped as a straight line. Therefore, Banta, Jr. must disclose or suggest this feature in order for the combination of Miller and Banta, Jr. to render claim 21 obvious.

As for Banta, Jr., it is relied upon as disclosing the use of both a linear scan pattern 14 and sector scan patterns 16 and 18 in a composite scan pattern 12. (See column 4, lines 34-48). However, it is clear that Banta, Jr. also fails to disclose or suggest the above-discussed feature of the controller recited in claim 21. As a result, claim 21 is patentable over the combination of Miller and Banta, Jr.

Further, it is noted that claims 25, 29 and 33 are patentable over the combination of Miller and Banta, Jr. for reasons similar to those set forth above with regard to claim 21. That is, claims 25, 29 and 33 each recite, in part, a controller that, when parallel reception is performed, controls delay times corresponding to respective elements of an array of elements in reception dynamic focusing so that a composite beam of a received beam and a transmitted beam is substantially shaped as a straight line at least in certain areas, which feature is not disclosed or suggested by the references.

Claim 23 is patentable over the combination of Miller and Banta, Jr., since claim 23 recites an ultrasonic diagnostic apparatus including, in part, a controller such that when parallel reception is performed by the ultrasonic diagnostic apparatus, the controller controls one of (i) gains of a receiving circuit, the gains corresponding to respective elements of an array of elements and (ii) the gains of the receiving circuit and delay times corresponding to the respective elements of the array of elements, to meander a movement track of focus points in

reception dynamic focusing in relation to transmission focus positions so that a composite beam of a received beam and a transmitted beam is substantially shaped as a straight line.

In the present invention, as recited in claim 23, directivity of a received beam is controlled by controlling gains of a receiving circuit, whereby a composite beam between the received beam and a transmitted beam is substantially shaped as a straight line. With this configuration, the composite beams, each between a transmitted beam and a received beam, can be formed in parallel even during parallel reception, and thus, the significant effect of preventing the appearance of vertical strips on a display image can be achieved. As a result, distortion of an associated image is reduced. The combination of Miller and Banta, Jr. fails to disclose or suggest this feature of claim 23.

Regarding this, Miller also discloses that each of the receive beamformer channels 225 includes a variable gain amplifier that controls gain as a function of received signal depth. (See page 7, paragraph [0087]). However, there is no disclosure or suggestion in Miller that the control processor 140 controls one of (i) gains of a receiving circuit, the gains corresponding to respective elements of an array of elements and (ii) the gains of the receiving circuit and delay times corresponding to the respective elements of the array of elements, so that a composite beam of a received beam and a transmitted beam is substantially shaped as a straight line. Therefore, Banta, Jr. must disclose or suggest this feature in order for the combination of Miller and Banta, Jr. to render claim 23 obvious.

As for Banta, Jr., it is relied upon as disclosing the use of both the linear scan pattern 14 and the sector scan patterns 16 and 18 in the composite scan pattern 12. (See column 4, lines 34-48). However, it is clear that Banta, Jr. also fails to disclose or suggest the above-discussed feature of the controller recited in claim 23. As a result, claim 23 is patentable over the combination of Miller and Banta, Jr.

Additionally, it is noted that claims 27, 31 and 35 are patentable over the combination of Miller and Banta, Jr. for reasons similar to those set forth above with regard to claim 23. That is, claims 25, 29 and 33 each recite, in part, a controller that, when parallel reception is performed, controls one of (i) gains of a receiving circuit, the gains corresponding to respective elements of an array of elements and (ii) the gains of the receiving circuit and delay times corresponding to the respective elements of the array of elements, in reception dynamic focusing so that a

composite beam of a received beam and a transmitted beam is substantially shaped as a straight line at least in certain areas, which feature is not disclosed or suggested by the references.

Because of the above-mentioned distinctions, it is believed clear that claims 21-36 are allowable over the references relied upon in the rejections. Furthermore, it is submitted that the distinctions are such that a person having ordinary skill in the art at the time of invention would not have been motivated to make any combination of the references of record in such a manner as to result in, or otherwise render obvious, the present invention as recited in claims 21-36. Therefore, it is submitted that claims 21-36 are clearly allowable over the prior art of record.

In view of the above amendments and remarks, it is submitted that the present application is now in condition for allowance. The Examiner is invited to contact the undersigned by telephone if it is felt that there are issues remaining which must be resolved before allowance of the application.

Respectfully submitted,

Morio NISHIGAKI

By:



David M. Ovedovitz
Registration No. 45,336
Attorney for Applicant

DMO/jmj
Washington, D.C. 20006-1021
Telephone (202) 721-8200
Facsimile (202) 721-8250
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